

THE ECONOMIC ADVANTAGES OF REINFORCED CONCRETE BUILDING CONSTRUCTION



Prepared by

CONCRETE REINFORCING STEEL INSTITUTE
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Planning a new office building, hospital, school, hotel, factory? Investigate the savings in cost and time, as well as the structural and design advantages of monolithic reinforced concrete construction.

Only monolithic reinforced concrete fully utilizes the combined advantages of steel and concrete to give you the most rugged structural frame possible. Also, it is a highly versatile construction material. Reinforced concrete allows architects to design with greater freedom to create structures of individual beauty and maximum operational efficiency at the lowest possible cost.

So, before you build any type of building . . .

**Ask your architect about the
unique advantages of this
superior construction material**

LOWER CONSTRUCTION COST

Impartial comparisons of cost between reinforced concrete and structural steel have proved the lower cost of concrete construction to the New York City Housing Authority.

Particularly notable of these are the Borgia Butler Houses in the Bronx and the Woodrow Wilson Housing Project in New York City.

Borgia Butler Houses

In this project, competitive bidding in January 1961 among six contractors showed a savings of \$847,000 to \$1,693,000 with reinforced concrete design. Bidding was based upon (1) bar reinforced concrete structural frame and slabs and (2) structural steel frames with concrete slabs reinforced with welded wire fabric. The following table shows the six individual contractor bids for the two designs.

Contractor	Concrete	Structural Steel	Economy Difference
A	\$8,107,000	\$9,800,000	\$1,693,000
B	8,428,000	9,884,540	1,456,540
C	8,547,000	9,700,000	1,153,000
D	8,548,550	9,748,550	1,200,000
E	8,583,000	9,430,000	847,000
F	8,673,000	9,795,000	1,122,000
Average	8,481,091	9,643,015	1,245,256

This study confirmed earlier comparisons. All of New York's housing projects, with few exceptions, have been concrete frame structures.

Woodrow Wilson Housing Project

The reinforced concrete design and the structural steel design for this project were prepared independently of each other to insure the best utilization of each material. Competitive bids of nine contractors showed concrete framing to be from 8% to 20% less than structural steel—saving \$300,000 to \$731,000. Actual bids are as follows:

Contractor	Concrete	Structural Steel	Economy Difference
A	\$3,626,000	\$4,135,000	\$510,000
B	3,639,000	3,939,000	300,000
C	3,660,000	4,086,000	426,000
D	3,669,000	4,400,000	731,000
E	3,758,000	4,488,000	731,000
F	3,771,000	4,161,000	390,000
G	3,860,000	4,500,000	640,000
H	4,060,000	4,960,000	436,000
I	4,238,000	4,649,000	411,000
Average	3,809,000	4,317,000	508,000



Credits:

Borgia Butler Houses
Bronx—New York, New York
Architect: Seymour R. Joseph, A.I.A., New York
Engineers: Weinberger, Frieman, Leichtman, & Quinn,
New York
Contractor: Terminal Construction Corp.,
Wood-Ridge, New Jersey



Woodrow Wilson Housing Project
Franklin D. Roosevelt Drive
New York, New York

Architect: Pomerance & Breines, New York
Consulting Engineer: James Ruderman, New York
Engineers: Leon D. DeMatheis & Son, Inc., New York
Contractor: Leon D. DeMatheis Construction Corp.,
New York

**Other Outstanding Examples
of Reinforced Concrete's
Lower Cost**

- **Dante Place Housing Project, Buffalo, New York**—The use of reinforced concrete for this project resulted in a structural savings of over \$230,000.
- **Long Island University, C. W. Post College Dormitory and Related Facilities, Brooklyn, New York**—Competitive bidding on these buildings to be constructed during 1961 indicate a savings of over \$33,000 with reinforced concrete design.
- **Phoenix Towers, Phoenix, Arizona**—Reinforced concrete framing saved 14% in the construction of this \$3,000,000 luxury apartment building.

For any type of building, anywhere, ask your architect or consulting engineer to determine how similar savings can be achieved for your specific project through the use of reinforced concrete design.

STRUCTURAL BEAUTY

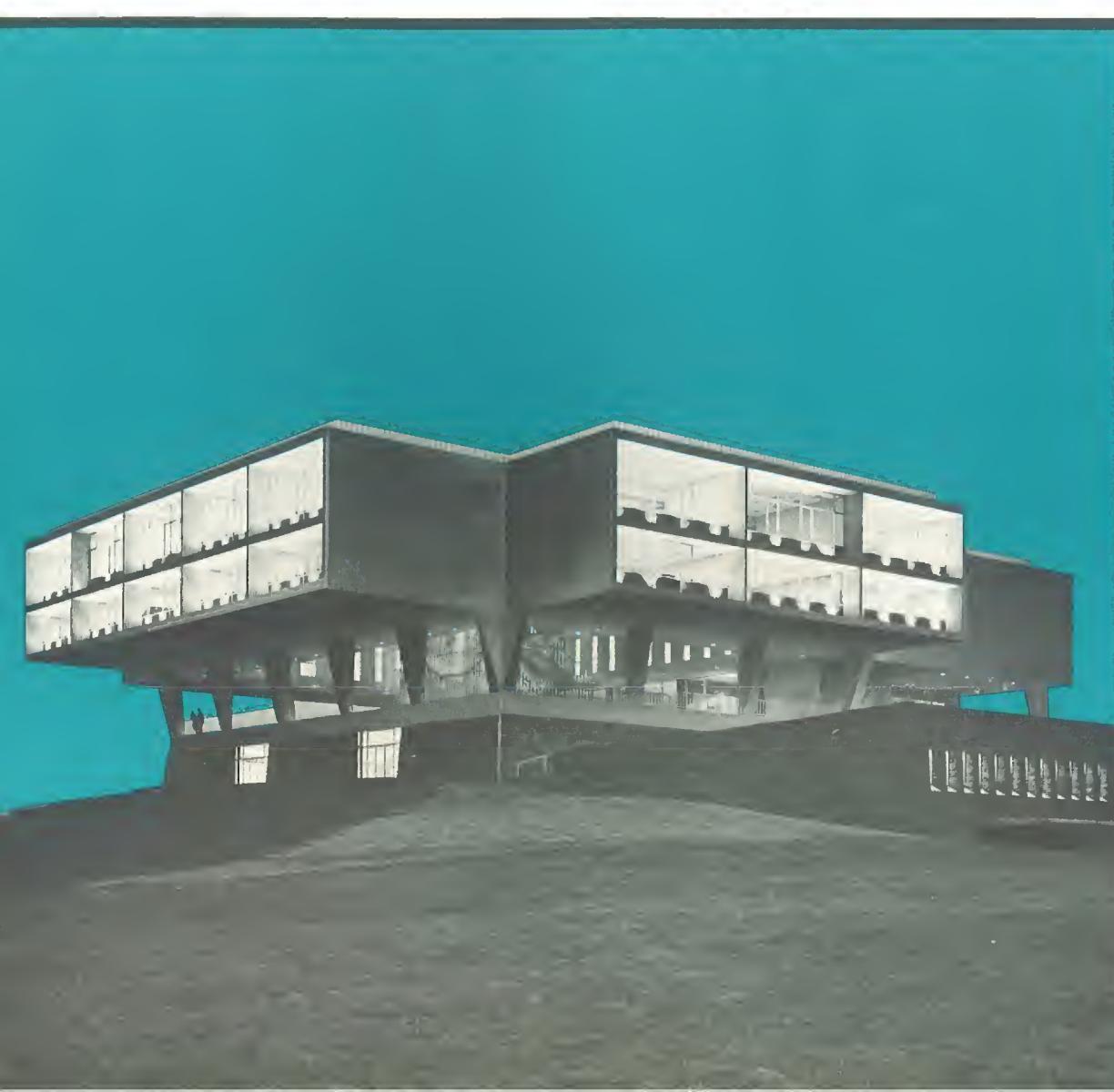
The free-forming qualities of monolithic reinforced concrete and its compatibility with glass and other construction materials provide architects with the means of achieving greater structural beauty without auxiliary ornamentation. In the design of Lambert-St. Louis Air Terminal, the architects utilized all the advantages of reinforced concrete's design freedom to achieve this structure of extreme beauty and pleasing symmetry. Note the thin-shell concrete roof.

Because reinforced concrete is a pliable medium, it can be formed into many intricate shapes for individual design expression—it can be curved, arched, made square, made round. Architects can break away from stereotyped building forms necessary with other construction materials.

Lambert-St. Louis Municipal Air Terminal, St. Louis, Missouri
Architects: Hellmuth Yamasaki & Leinweber, St. Louis
Structural Engineers: William C. Becker, St. Louis
General Contractor: L & R Construction Co., St. Louis



DESIGN FLEXIBILITY



Milwaukee's War Memorial Building is an outstanding example of the greater design freedom possible with monolithic reinforced concrete. Constructed on the edge of the Lake Michigan bluff, its lightweight, cantilevered wings of reinforced concrete give an effect of soaring flight. The glass walls offer an unobstructed view of the lake and surrounding area. In the center of this unusual structure are six levels, including a basement and subbasement.

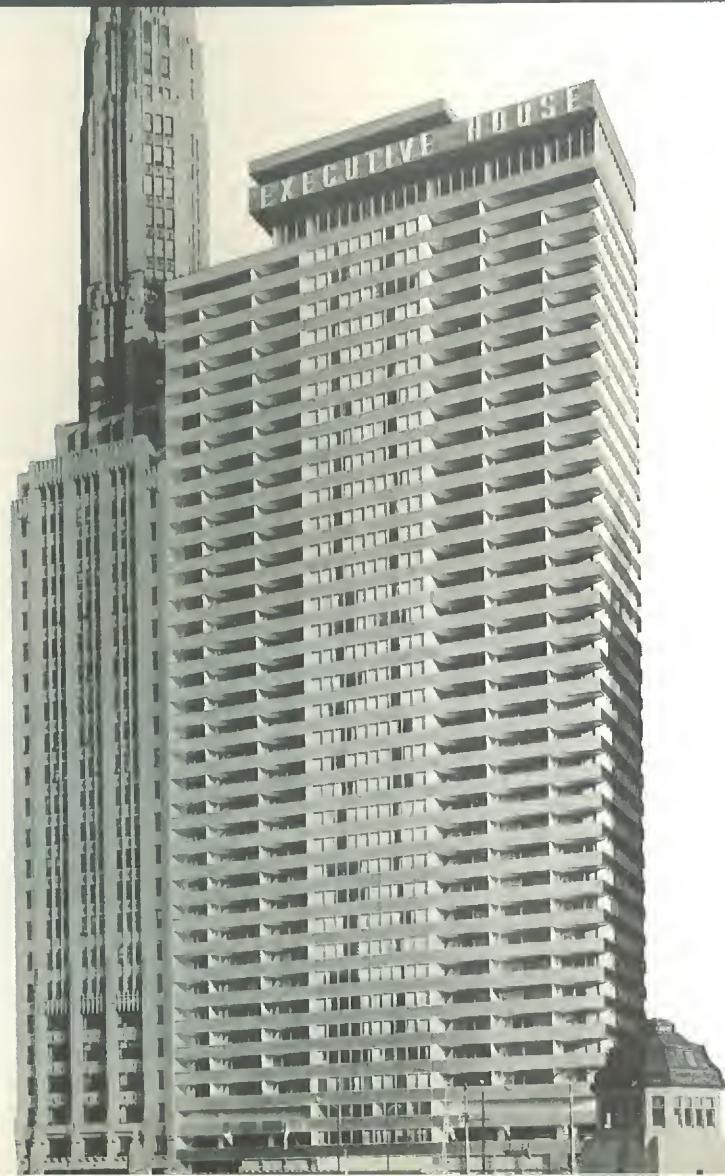
Today, in every type of building construction, monolithic reinforced concrete allows architects and engineers greater freedom in creating buildings to satisfy the special requirements of the occupants.

Milwaukee War Memorial Building, Milwaukee, Wisconsin
Architect: Eero Saarinen & Associates, Milwaukee
Structural Engineers: Ammann & Whitney, Milwaukee
General Contractor: James McHugh Construction Co., Milwaukee

REDUCES BUILDING HEIGHTS

The lower building heights possible with monolithic reinforced concrete flat plate design enables architects to create multistory structures with lower over-all silhouettes. This beamless type of construction can reduce floor-to-floor heights by 6 inches or more per story—or enough savings for one additional story in a standard 20-story building. This saving can be readily seen in the new 40-story Executive House Hotel standing immediately adjacent to a taller 38-story steel structure on Chicago's Wacker Drive.

Executive House, Chicago, Illinois
Architect: Milton M. Schwartz & Associates, Inc., Chicago
Structural Engineers: Miller Engineering Company, Chicago
General Contractor: Wacker Construction Corp., Chicago



FIRE SAFETY



Monolithic reinforced concrete is the lowest cost fire-resistant structural material available—an important consideration for every type of building. It requires no other fire-protective covering. Reinforced concrete will not burn, buckle, or twist, and has withstood the tests of the world's most severe fires. In actual Underwriter's Laboratory tests, concrete with reinforcing bars has withstood excessive temperatures up to 2350° F without noticeable effect upon its structural strength or rigidity.

Proviso West High School, Hillside, Illinois
Architects & Engineers: Perkins & Will, Chicago, Illinois
General Contractors: Manon Company, Oak Park, Illinois

FASTER CONSTRUCTION— EARLIER BUILDING OCCUPANCY

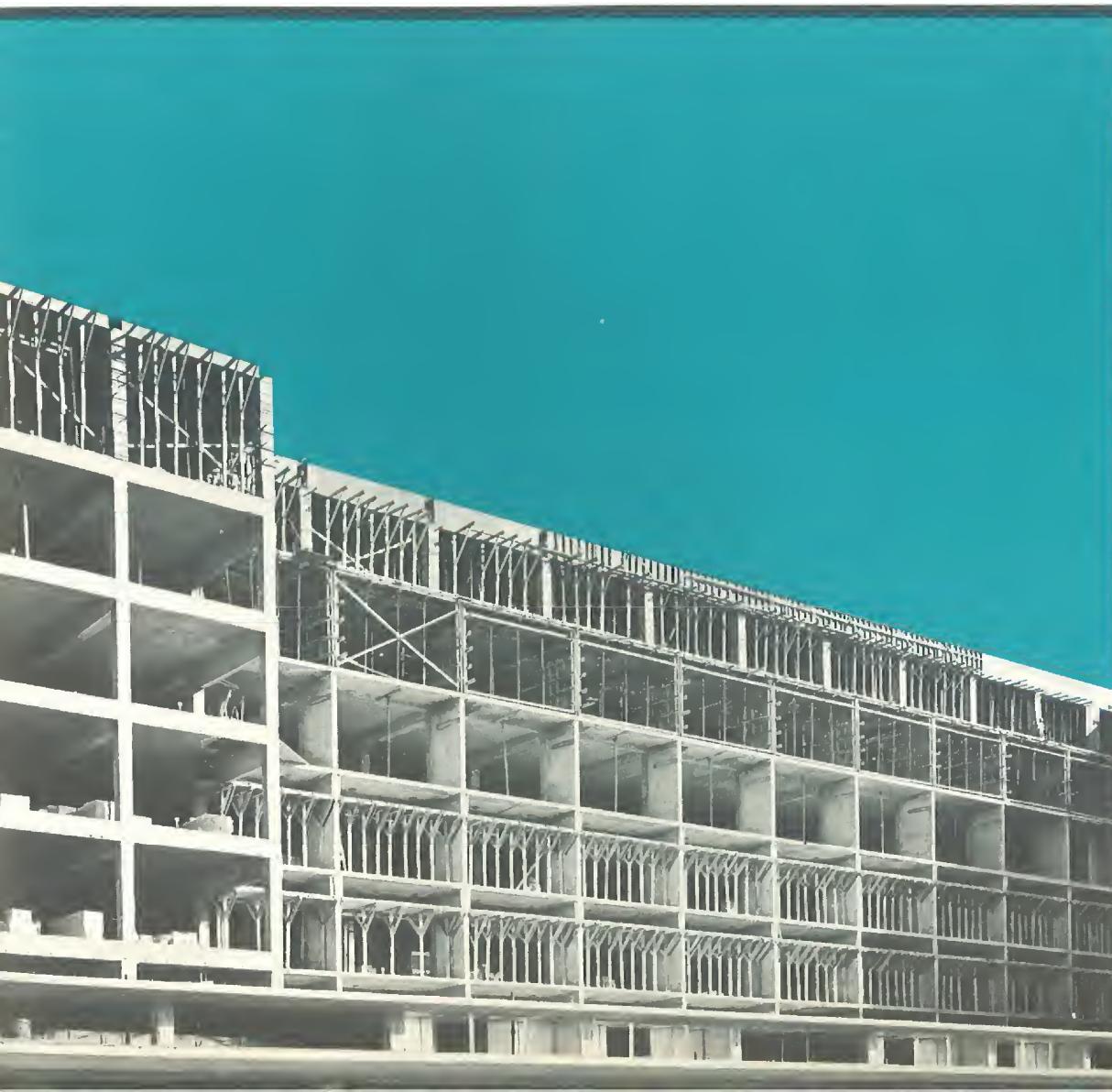
One story every three working days, from the fifth floor up, is a record established by the Crane Construction Company in the monolithic reinforced concrete framing of this 35-story apartment building. Masonry, lathing, plastering, and other trades were able to follow at a similar schedule to assure early completion and occupancy.

Modern handling methods and new construction techniques continue to increase the speed and efficiency with which reinforced concrete frames are erected.

1550 Lake Shore Drive Building, Chicago, Illinois
Architects and Engineers: Shaw, Metz & Dolio, Chicago, Illinois
General Contractors: Crane Construction Company
Chicago, Illinois

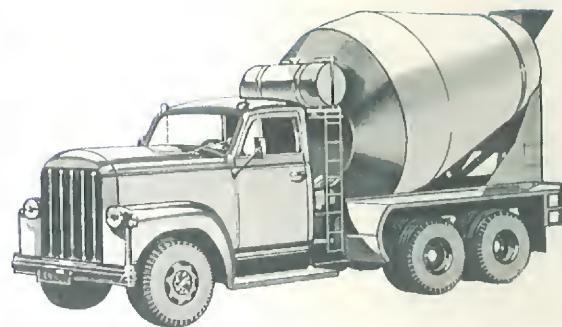


RIGID-MONOLITHIC CONSTRUCTION



Monolithic reinforced concrete is one-unit construction—no bolts, welds, or rivets. Frame and floors are completed simultaneously to provide the most rugged structure possible. Properly designed, the greater rigidity of reinforced concrete minimizes the effect of horizontal forces in very tall buildings, making them highly resistant to the effects of shock, wind, and quakes.

AVAILABILITY OF MATERIALS



The availability of fabricated reinforcing steel bars from local stock, and concrete from local plants, is an important time and moneysaving advantage when you utilize monolithic reinforced concrete construction. It is not uncommon for reinforcing steel and concrete to be delivered to the job site within 48 hours after an order is placed. Your building can be started earlier and can be completed on schedule without delay. In addition, field design changes can be made on the spot without seriously affecting material specifications or delivery schedules.

ADDITIONAL ADVANTAGES

1. **Lower Maintenance Cost**—Reinforced concrete can be exposed to all elements without paint or other protection. It also resists deterioration—won't rot or corrode.
2. **Low Insurance Rates**—Based upon occupancy and local or state fire codes, reinforced concrete building insurance rates are usually less.
3. **Deadens Sound**—Reinforced concrete reduces transmission of sound and vibrations throughout the building.
4. **Better Accommodation of Mechanical Equipment**—Reinforced concrete reduces operational noise and vibration of air conditioning units, elevators, office machinery, and other equipment.
5. **Under Floor Electrical Distribution**—Electrified concrete joist floors (R/C Duct) provide 100% electrical flexibility at a cost much less than cellular steel flooring.



John Hans Graham, A.I.A., Washington, D.C., states, "The speed of construction, the resultant economy, and greater design freedom are invaluable assets that more than justify the choice of reinforced concrete."

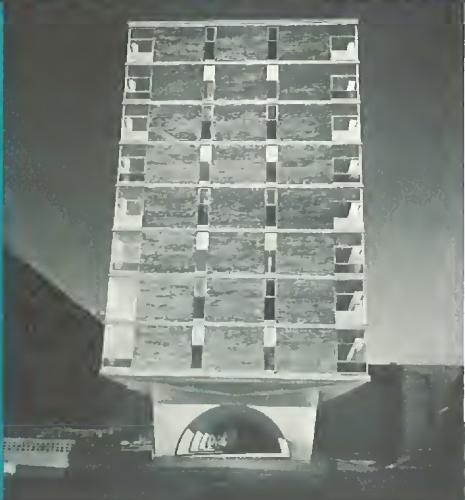
**Prominent architects,
contractors, and building
owners testify to the
advantages of reinforced
concrete construction.**



"When we were planning our home office building, our architects recommended reinforced concrete, we decided on it, we're very happy with the results," says Mr. Fred Schaaf, Superintendent of Properties of the Nationwide Mutual Insurance Company, Columbus, Ohio.

"Before construction, several types of materials were investigated. Reinforced concrete proved to be the most economical. And there were additional considerations—underfloor electric ducts could be placed integrally in the joist system, anchors for the stone facing could be cast into the spandrel beams, and all materials were available locally so that construction could continue without interruptions."

Mr. Morton J. Crane, President of Crane Construction Company, Inc., Chicago, Illinois, says, "We can now build a complete multi-story building faster and cheaper with reinforced concrete framing than with any other framing material. The simplicity of reinforced concrete speeds the work of other building trades, too."



**SOME OUTSTANDING
MODERN REINFORCED
CONCRETE BUILDINGS**



